

REMARKS

As recited in Claim 21, the present invention is a method comprising reacting a polyol in an open mold with a polyisocyanate compound in the presence of a catalyst, a blowing agent and a foam stabilizer to form a flexible polyurethane foam, wherein the polyol has a hydroxyl value of at most 15 mgKOH/g and the polyisocyanate compound is a modified polymethylenepolyphenyl polyisocyanate.

Applicants have discovered that the use of a modified polymethylenepolyphenyl polyisocyanate, otherwise known as modified crude MDI, as the polyisocyanate compound, results in a flexible polyurethane foam having a dry heat compression set, which is an index of durability of a flexible foam, that is superior to corresponding foams made by using other polyisocyanate compounds. This superiority is demonstrated in the comparative data in the specification herein. Examples 8 and 9 employ a polyisocyanate designated as polyisocyanate d3, described in the paragraph bridging pages 21 and 22 of the specification, and which is within the terms of the present claims. Example 7 employs a polyisocyanate designated as polyisocyanate d2; Example 10 employs a polyisocyanate designated as polyisocyanate d4. Polyisocyanate d2 and polyisocyanate d4 are essentially crude MDI, and a mixture of crude MDI and monomeric MDI, respectively, as shown in Table 1 at page 22 of the specification. Table 3, at page 24 of the specification, shows that the dry heat compression set for Examples 8 and 9 was 1.7% and 1.4%, respectively, while the dry heat compression set for Examples 7 and 10 was 2.6% and 6.6%, respectively. The ideal value for dry heat compression set is 0%, which is very difficult to obtain. Approaching 0%, such as obtaining a dry heat compression set of less than 2%, is also very difficult.

The significance of using a modified polymethylene polyphenylpolyisocyanate as the polyisocyanate compound, and the superior results obtained thereby, could not have been predicted by the applied prior art.

The rejection of Claims 21-38 under 35 U.S.C. § 102(b) as anticipated by U.S. 5,093,380 (Takeyasu et al), is respectfully traversed. Takeyasu et al discloses polyurethane flexible foams obtained by using at least one member selected from the specific polyoxyalkylene polyol and a polymer-dispersed polyol containing said polyoxyalkylene polyol as the matrix and a polyisocyanate compound as the main reactive materials, wherein the polyurethane flexible foam has a resonant frequency of not higher than 4.0 Hz (column 1, line 33ff). Regarding the polyisocyanate compound, Takeyasu et al discloses that "[m]ore preferably, a mixture comprising at least one of MDI [diphenylmethane diisocyanate], crude MDI and their modified products, and TDI [tolylene diisocyanate] or its modified products, is employed" (column 5, lines 44-46).

Takeyasu et al does not anticipate the presently-claimed invention. Takeyasu et al neither discloses nor suggests the use of an open mold. The only mold described in a closed mold, as shown in the examples. See, for example, column 8, line 15. Nor does Takeyasu et al require that their polyol have a hydroxyl value of at most 15 mgKOH/g, and that their polyisocyanate compound be a modified product of crude MDI. While Takeyasu et al lists exemplary polyols that have a hydroxyl value less than 15 mgKOH/g, i.e., polyols B, C, E and F, and while, as discussed above, modified products of crude MDI are listed as applicable, none of the examples of Takeyasu et al combine a polyol and a polyisocyanate compound of the present claims. As stated in *In re Arkley*, 172 USPQ 524, 526 (CCPA 1972):

[R]ejections under 35 U.S.C. 102 are proper only when the claimed subject matter is identically disclosed or described in "the prior art." Thus, for the instant rejection under 35 U.S.C. [102(b)] to have been proper, the . . . reference must clearly and unequivocally disclose the claimed [subject matter] or direct those skilled in the art to the [subject matter] without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference. Such picking and choosing may be entirely proper in the making of a 103, obviousness rejection, where the applicant must be afforded an opportunity to rebut with objective evidence any inference of obviousness which may arise from the

similarity of the subject matter which he claims to the prior art, but it has no place in the making of a 102, anticipation rejection.

Thus, Takeyasu et al does not anticipate the presently-claimed invention. Nor does Takeyasu et al otherwise render the presently-claimed invention unpatentable, since one skilled in the art reading Takeyasu et al would be clueless regarding the relationship of dry heat compression set and the particular polyisocyanate used.

For all the above reasons, it is respectfully requested that the rejection over Takeyasu et al be withdrawn.

The rejection of Claims 21-38 under 35 U.S.C. § 102(b) as anticipated by EP 1,022,300 (Sugiyama et al), is respectfully traversed. Sugiyama et al was cited as an "A" reference, technological background only, in the corresponding European application. Sugiyama et al discloses, *inter alia*, a polyurethane foam produced by using a particular polyether polyol having a hydroxyl number of from 5 to 38 mgKOH/g and a polyisocyanate "such as tolylene diisocyanate (TDI), diphenylmethane diisocyanate (MDI), polymethylene polyphenyl isocyanate (popular name: crude MDI), xylylene diisocyanate (XDI), isophorone diisocyanate (IPDI) or hexamethylene diisocyanate (HMDI), or its prepolymer type modified product, nurate modified product, urea modified product or carbodiimide modified product may, for example, be mentioned" [0077]. Sugiyama et al further discloses that molding is carried out preferably by a method of directly injecting a reactive mixture into a closed mold by using a low-pressure foaming machine or high-pressure foaming machine, or by a method of spreading a reactive mixture into a mold in an open state [0083]. All of the polyols exemplified by Sugiyama et al have a hydroxyl number higher than the presently-recited maximum of 15 mgKOH/g, as shown in Table 2 at page 15 thereof. None of the exemplified polyisocyanates is a modified product of crude MDI. See Table 3 bridging pages 15 and 16 thereof. In addition, in all the examples showing the production of a flexible polyurethane

foam, a closed mold was used [0140]. Thus, under the doctrine of *Arkley, supra*, Sugiyama et al does not anticipate the presently-claimed invention. Nor does Sugiyama et al otherwise render the presently-claimed invention unpatentable, for the same reasons discussed above with regard to the rejection over Takeyasu et al. Note that in none of the examples of Sugiyama et al was the (dry) compression set as low as that demonstrated by above-discussed Examples 8 and 9 of the present invention.

For all the above reasons, it is respectfully requested that the rejection over Sugiyama et al be withdrawn.

The rejection of Claims 21-39 under the judicially created doctrine of obviousness-type double patenting over Claims 1-41 of U.S. 6,734,219 (the parent patent) is respectfully traversed. The claims of the parent patent do not render the presently-claimed invention obvious, because one skilled in the art could not have predicted from the patent claims the significance of using the presently-recited modified polymethylene polyisocyanate as the polyisocyanate compound and the superior results obtained thereby. Accordingly, it is respectfully requested that this rejection be withdrawn.

The rejection of Claims 21-39 under the judicially created doctrine of obviousness-type double patenting over Claims 1-9 of U.S. 6,653,362 (Toyota et al), is respectfully traversed. The claims of Toyota et al are drawn to a process for producing a flexible polyurethane foam which comprises reacting a particular polyoxyalkylene polyol and a particular polyisocyanate compound in the presence of a catalyst and a blowing agent to produce a flexible polyurethane foam having a resonance frequency of at most 3.7 hz, a resonance ratio of at most 3.5 and an impact resilience of at most 7%. The claims of Toyota et al do not require that their polyol have a hydroxyl value of at most 15 mgKOH/g, and more significantly, the only requirement of the polyisocyanate compound therein is that it contain from 0 to 50 mass% in total of a diphenylmethane diisocyanate and/or a polymethylene

polyphenyl isocyanate. There is no disclosure or suggestion in the claims of Toyota et al to use a modified polymethylene polyphenyl polyisocyanate as the polyisocyanate compound therein, or that the use of such a polyisocyanate compound produces superior results, as discussed above. Accordingly, it is respectfully requested that this rejection be withdrawn.

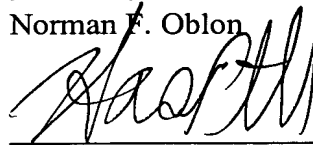
The rejection of Claims 21-39 under 35 U.S.C. § 112, first paragraph, as failing to comply with the enablement requirement thereof, is respectfully traversed. Modified products of crude MDI, as described in the specification at the paragraph bridging pages 11 and 12, are well-known in the art, as is the present nomenclature herein used, as supported by both Takeyasu et al and Sugiyama et al, *supra*. Accordingly, it is respectfully requested that this rejection be withdrawn.

The rejection of Claim 23 under 35 U.S.C. § 112, first paragraph, as failing to satisfy the written description requirement therein, is now moot in view of the above-discussed amendment. Accordingly, it is respectfully requested that it be withdrawn.

All of the presently-pending claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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